

REMARKS/ARGUMENTS

Claims 1 through 13 are currently pending in the application.

Claims 1 through 7, 12, and 13, have each been amended to delete “avocado, common plantain, oriental senna, hawthorn.” A Request for Continued Examination (RCE) is being filed concurrently with this Amendment. Applicants respectfully request entry of the present Amendment, and submit that the Amendment overcomes the pending obviousness rejections, for the reasons below.

Claims 1 through 13 are rejected under 35 U.S.C. §103(a) over (1) WO 98/58656 to Bank, et al. (hereinafter, “Bank”) in view of: (2) Crawford, et al., *J. Agric. Food Chem.* (1990), vol. 38, pages 2169 – 2175 (hereinafter, “Crawford”); or (3) “Medicinal Plants in the South Pacific,” WHO Regional Publications (1998) Western Pacific Series No. 19, page 149 (hereinafter, “Medicinal Plants”); or (4) Torres, et al., *J. Agric. Food Chem.* (1987), vol. 35, pages 921 – 925 (hereinafter, “Torres”); or (5) Chang, et al., *J. Chromatogr. B.* (2000), vol. 760, pages 227 – 235 (hereinafter, “Chang”).

Claim 1 of the present disclosure recites, in pertinent part, “...a **flavor deterioration inhibitor** or an **inhibitor for the generation of deterioration smell of citral or a citral-containing product**, which comprises an extract obtained by **extracting ashitaba, semi-fermented tea leaves or fermented tea leaves...**” [emphasis added].

Likewise, claims 2 – 7 and claims 12 – 13, which are also independent claims, provide an inhibitor comprising an extract that is “...obtained by **extracting ashitaba, semi-fermented tea leaves or fermented tea leaves...**” [emphasis added].

Bank generally discloses certain plant extracts used as a stabilizing agent for citrus-flavored compositions; specifically, plant extracts that have caffeic acids such as rosmarinic acid (rosmarinic acid is a dimer of caffeic acid) (page 3, lines 10 – 12; and page 5, line 12). The disclosed plant extracts are made from dried, whole rosemary leaves, or from other plants also in the *Labiatae* (mint) family (page 5, lines 28 – 34; page 7, lines 21 – 34; and page 9, lines 21). Bank teaches that her results for rosmarinic acid plant extracts were “surprising” and unexpected (page 3, lines 22 – 24) because it had previously been reported in the art that certain other “free radical terminators are *ineffective* in preventing citral degradation” [emphasis added] (page 7, lines 10 – 14), even though rosmarinic acid is also a free radical terminator (page 7, lines 10 – 11). Bank concluded that her results with the antioxidant rosmarinic acid were surprising and unexpected precisely because “mechanisms of citral degradation are not known with certainty,” and because other conventional stabilizing additives in the art (particularly antioxidants BHT and BHA) failed to effectively stabilize citral solutions. Of note for this discussion, Bank did not provide supporting data or results for any other plant extracts having caffeic acid or its derivatives, apart from extracts containing rosmarinic acid.

However, it does not always follow from the disclosure in Bank that *any* plant extract containing caffeic acid or its derivatives effectively stabilizes citral. In fact, the present application provides experimental data that chlorogenic acid (a caffeic acid derivative), was relatively *ineffective* under test conditions to prevent degradation of citral, as measured by: (1) generation of large amounts of citral degradation products *p*-cresol and/or *p*-methylacetophenone (Test Example 36/Table 36); and (2) sensory evaluations for unpalatable taste or off-odors (Test Examples/Tables 37 and 38) produced by these degradation products.

Bank's disclosure thus erroneously implies that any other plant extracts containing caffeic acid or its derivatives would likewise stabilize citral solutions (see, e.g., page 3, line 12) as with extracts of rosmarinic acid in the absence of supporting information. As shown by experimental data in the present application, plant extracts containing another caffeic acid derivative (chlorogenic acid), were largely ineffective in preventing degradation of citral under testing conditions. Consequently, Bank's broad disclosures (beyond those supported by her data for rosmarinic acid) are insufficient to be extrapolated to render obvious the particular extracts in independent claims 1 through 7, 12, and 13, which recite an extract "obtained by extracting ashitaba, semi-fermented tea leaves or fermented tea leaves."

Of pertinence to the discussion below, independent claims 1 through 7, 12, and 13, have been amended to delete "avocado," "common plantain," "oriental senna" and "hawthorn."

Crawford discloses the presence of caffeic acid in **oriental senna** (*Cassia obtusifolia*) as well as of chlorogenic acid (a caffeic acid derivative). However, the independent claims in the present application have been amended to delete “oriental senna.” As acknowledged in the Office Action, Bank is “silent” as to the use of an extract obtained from, *inter alia*, ashitaba, semi-fermented tea leaves or fermented tea leaves, as in the present independent claims, and thus Crawford fails to supplement the deficiency in Bank. In addition, chlorogenic acid does not effectively stabilize citral solutions under test conditions, as discussed above. Therefore, for these reasons, the combination of Bank with Crawford fails to disclose or suggest independent claims 1 through 7, 12, and 13.

Similarly, the “Medicinal Plants” article discloses the presence of caffeic acid and chlorogenic acid in **common plantain** (*Plantago major* L.). As noted above, the independent claims have been amended to delete “common plantain.” The Office Action acknowledges that Bank is silent as to extracts from ashitaba, semi-fermented tea leaves or fermented tea leaves (in the independent claims), and Medicinal Plants fails to supplement this deficiency in Bank. Therefore, Bank and Medicinal Plants, taken alone or in combination, fail to disclose or suggest independent claims 1 through 7, 12, and 13.

Torres is cited in the Office Action for teaching the presence of caffeic acid in **avocado** (*Persea americana*). However, the independent claims are now amended to delete “avocado.” Thus, Bank and Torres, considered alone or in combination, fail to

disclose or suggest an extract from ashitaba, semi-fermented tea leaves or fermented tea leaves, as in independent claims 1 through 7, 12, and 13.

Finally, Chang teaches that chlorogenic acid can be found in the fruits of **hawthorn** (*Crataegus pinnatifida*). As above, the independent claims have been amended to delete “hawthorn.” Thus, the combination of Bank and Chang neither discloses nor suggests all features in independent claims 1 through 7, 12, and 13.

Accordingly, for all of the above reasons, independent claims 1 through 7, 12, and 13, are not obvious over Bank, considered alone or in combination with Crawford, Medicinal Plants, Torres, and/or Chang.

Furthermore, for the same reasons as provided for the independent claims, dependent claims 8 through 11 are not rendered obvious over Bank, taken alone or in combination with Crawford, Medicinal Plants, Torres, and/or Chang.

An additional argument distinguishing the claims from the cited art is that, while the Office Action acknowledges that “ashitaba, semi-fermented tea leaves and fermented tea leaves *are known in the art to contain high levels of polyphenols*” (page 3, no. 13), it erroneously concludes that “...it would have been obvious to one of ordinary skill in the art...*to have substituted an extract from a plant containing polyphenols, caffeic acid, or a caffeic acid derivative* as taught by Crawford et al., WHO [Medicinal Plants], Torres et al., or Chang et al., in the compositions or method taught by Bank et al. in order to inhibit

the degradation of the citrus flavor” (page 4, no. 14) [emphasis added]. However, Applicants respectfully submit the following reasons why the conclusion is erroneous and would *not* have been obvious: (1) Polyphenols are chemical substances having more than one phenol unit in the chemical structure, and polyphenol units are found in a large variety of chemical substances. The chemical structures of compounds having polyphenol units can be quite different from one another, even though all are still classified as polyphenols – for example, comparing the chemical structures of catechin or theaflavin (found in high concentrations in fermented tea leaves) with the chemical structures of caffeic acid and rosmarinic acid. Also, the experimental data in the present application clearly demonstrate that at least some products containing polyphenols, rutin and chlorogenic acid, were largely ineffective in inhibiting generation of citral degradation products *p*-cresol and *p*-methylacetophenone that are sources of off-odors. Consequently, it does not follow (nor would it have been obvious) that any plant extract containing polyphenols would necessarily be effective in stabilizing citral, or could be substituted for a plant extract containing a different polyphenol with a reasonable expectation of success, simply because both extracts contained polyphenols. When considered in view of Bank’s emphasis on her “surprising” results, and her teaching that mechanisms of citral degradation are not known with certainty, it would *not* have been obvious at all, based on the cited references, to substitute an extract containing polyphenols for the compositions or methods taught by Bank.

Therefore, for all of the above reasons, independent claims 1 through 7, 12, and 13, are not obvious over Bank, taken alone or in combination with Crawford, Medicinal Plants, Torres, and/or Chang.

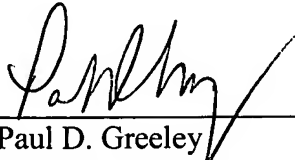
For at least the same reasons as provided for the independent claims, dependent claims 8 through 11 are likewise not obvious over Bank, taken alone or in combination with Crawford, Medicinal Plants, Torres, and/or Chang.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections to claims 1 through 13 in the present application.

A Request for Continued Examination (RCE) is being filed concurrently with this Amendment. Applicants request entry and consideration of the Amendment, and passage of the pending claims to allowance.

Respectfully submitted,

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Date



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